STIC Search Report
EIC 1700

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STIC Database Tracking Number: 129971

TO: Melvyn Andrews
Location: Rem 6A01
Art Unit : 1742
August 24, 2004

Case Serial Number: 10/018406

From: Kathleen Fuller
Location: EIC 1700
REMSEN 4B28
Phone: 571/272-2505
Kathleen.Fuller@uspto.gov

Search Notes

sira
Search and Information Resources Administration

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=> FILE HCAPLUS
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FILE COVERS 1907 - 24 Aug 2004  VOL 141 ISS 9
FILE LAST UPDATED: 23 Aug 2004  (20040823/ED)

 This file contains CAS Registry Numbers for easy and accurate
 substance identification.

=> D QUE L20
L5         12565 SEA FILE=HCAPLUS ABB=ON  SPUTTER?(3A)TARGET?
L6            61 SEA FILE=HCAPLUS ABB=ON  L5 AND INCLUSION?
L7             3 SEA FILE=HCAPLUS ABB=ON  L6 AND (AL OR ALUMINA OR ALUMINUM OR
                 ALUMIUM OR AL2O OR ALUMINUM(W)OXIDE) AND (CU OR COPPER) AND
                 (SI OR SILICON)
L8          2393 SEA FILE=HCAPLUS ABB=ON  L5 AND ALLOY?
L9            17 SEA FILE=HCAPLUS ABB=ON  L6 AND L8
L10            3 SEA FILE=HCAPLUS ABB=ON  L7 AND L8
L11         6262 SEA FILE=HCAPLUS ABB=ON  (LOW OR SIZE OR MINUTE OR SMALL OR
                 800 OR 400)(3A)INCLUSION?
L12            4 SEA FILE=HCAPLUS ABB=ON  L9 AND L11
L13         1332 SEA FILE=HCAPLUS ABB=ON  (MU OR MICRON?)(3A)INCLUSION?
L14            1 SEA FILE=HCAPLUS ABB=ON  L13 AND L9
L18            3 SEA FILE=HCAPLUS ABB=ON  L6 AND (AL OR ALUMINA OR ALUMINUM OR
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L19            3 SEA FILE=HCAPLUS ABB=ON  L18 AND L10
L20            5 SEA FILE=HCAPLUS ABB=ON  L19 OR L18 OR L12 OR L14

=> FILE WPIX
FILE 'WPIX' ENTERED AT 14:41:32 ON 24 AUG 2004
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FILE LAST UPDATED:            23 AUG 2004      <20040823/UP>
MOST RECENT DERWENT UPDATE:      200454         <200454/DW>
DERWENT WORLD PATENTS INDEX SUBSCRIBER FILE, COVERS 1963 TO DATE

>>> FOR A COPY OF THE DERWENT WORLD PATENTS INDEX STN USER GUIDE,
    PLEASE VISIT:
 http://www.stn-international.de/training_center/patents/stn_guide.pdf <<<

>>> FOR DETAILS OF THE PATENTS COVERED IN CURRENT UPDATES, SEE
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    DOCUMENTATION NOW AVAILABLE IN DERWENT WORLD PATENTS INDEX
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    HIT STRUCTURES WITHIN THE BIBLIOGRAPHIC DOCUMENT  <<<

=> D QUE L21
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L8          2393 SEA FILE=HCAPLUS ABB=ON  L5 AND ALLOY?
L9            17 SEA FILE=HCAPLUS ABB=ON  L6 AND L8
L10            3 SEA FILE=HCAPLUS ABB=ON  L7 AND L8
L11         6262 SEA FILE=HCAPLUS ABB=ON  (LOW OR SIZE OR MINUTE OR SMALL OR
                 800 OR 400)(3A)INCLUSION?
L12            4 SEA FILE=HCAPLUS ABB=ON  L9 AND L11
L13         1332 SEA FILE=HCAPLUS ABB=ON  (MU OR MICRON?)(3A)INCLUSION?
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L18            3 SEA FILE=HCAPLUS ABB=ON  L6 AND (AL OR ALUMINA OR ALUMINUM OR
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L19            3 SEA FILE=HCAPLUS ABB=ON  L18 AND L10
L21            5 SEA FILE=WPIX ABB=ON  L19 OR L18 OR L12 OR L14


=> FILE INSPEC
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FILE LAST UPDATED: 23 AUG 2004        <20040823/UP>
FILE COVERS 1969 TO DATE.

<<< SIMULTANEOUS LEFT AND RIGHT TRUNCATION AVAILABLE IN
    THE BASIC INDEX >>>

=> D QUE L30
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L6            61 SEA FILE=HCAPLUS ABB=ON  L5 AND INCLUSION?
L7             3 SEA FILE=HCAPLUS ABB=ON  L6 AND (AL OR ALUMINA OR ALUMINUM OR
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L8          2393 SEA FILE=HCAPLUS ABB=ON  L5 AND ALLOY?
L9            17 SEA FILE=HCAPLUS ABB=ON  L6 AND L8
L10            3 SEA FILE=HCAPLUS ABB=ON  L7 AND L8
L11         6262 SEA FILE=HCAPLUS ABB=ON  (LOW OR SIZE OR MINUTE OR SMALL OR
                 800 OR 400)(3A)INCLUSION?
L12            4 SEA FILE=HCAPLUS ABB=ON  L9 AND L11
L13         1332 SEA FILE=HCAPLUS ABB=ON  (MU OR MICRON?)(3A)INCLUSION?
L14            1 SEA FILE=HCAPLUS ABB=ON  L13 AND L9
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L18           3 SEA FILE=HCAPLUS ABB=ON  L6 AND (AL OR ALUMINA OR ALUMINUM OR
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                (SI OR SILICON)
L19           3 SEA FILE=HCAPLUS ABB=ON  L18 AND L10
L22           1 SEA FILE=INSPEC ABB=ON  L19 OR L18 OR L12 OR L14
L24       68563 SEA FILE=INSPEC ABB=ON  ALUMINIUM ALLOYS+NT/CT
L25        5499 SEA FILE=INSPEC ABB=ON  INCLUSIONS+NT/CT
L26         277 SEA FILE=INSPEC ABB=ON  L24 AND L25
L27           3 SEA FILE=INSPEC ABB=ON  L26 AND SPUTTER?
L28       42398 SEA FILE=INSPEC ABB=ON  SPUTTERING+NT/CT
L29           1 SEA FILE=INSPEC ABB=ON  L26 AND L28
L30           3 SEA FILE=INSPEC ABB=ON  L22 OR L27 OR L29
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FILE LAST UPDATED: 7 JUL 2004       <20040707/UP>
FILE COVERS 1966 TO DATE.

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L6           61 SEA FILE=HCAPLUS ABB=ON  L5 AND INCLUSION?
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L8         2393 SEA FILE=HCAPLUS ABB=ON  L5 AND ALLOY?
L9           17 SEA FILE=HCAPLUS ABB=ON  L6 AND L8
L10           3 SEA FILE=HCAPLUS ABB=ON  L7 AND L8
L11        6262 SEA FILE=HCAPLUS ABB=ON  (LOW OR SIZE OR MINUTE OR SMALL OR
                800 OR 400)(3A)INCLUSION?
L12           4 SEA FILE=HCAPLUS ABB=ON  L9 AND L11
L13        1332 SEA FILE=HCAPLUS ABB=ON  (MU OR MICRON?)(3A)INCLUSION?
L14           1 SEA FILE=HCAPLUS ABB=ON  L13 AND L9
L18           3 SEA FILE=HCAPLUS ABB=ON  L6 AND (AL OR ALUMINA OR ALUMINUM OR
                ALUMIUM OR AL2O3 OR ALUMINUM(W)OXIDE) AND (CU OR COPPER) AND
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L19           3 SEA FILE=HCAPLUS ABB=ON  L18 AND L10
L31           3 SEA FILE=METADEX ABB=ON  L19 OR L18 OR L12 OR L14

=> FILE COMPENDEX
FILE 'COMPENDEX' ENTERED AT 14:42:17 ON 24 AUG 2004
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FILE LAST UPDATED: 23 AUG 2004       <20040823/UP>
FILE COVERS 1970 TO DATE.

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=> D QUE L32
L5        12565 SEA FILE=HCAPLUS ABB=ON  SPUTTER?(3A)TARGET?
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L6            61 SEA FILE=HCAPLUS ABB=ON  L5 AND INCLUSION?
L7             3 SEA FILE=HCAPLUS ABB=ON  L6 AND (AL OR ALUMINA OR ALUMINUM OR
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L8          2393 SEA FILE=HCAPLUS ABB=ON  L5 AND ALLOY?
L9            17 SEA FILE=HCAPLUS ABB=ON  L6 AND L8
L10            3 SEA FILE=HCAPLUS ABB=ON  L7 AND L8
L11         6262 SEA FILE=HCAPLUS ABB=ON  (LOW OR SIZE OR MINUTE OR SMALL OR
                 800 OR 400)(3A)INCLUSION?
L12            4 SEA FILE=HCAPLUS ABB=ON  L9 AND L11
L13         1332 SEA FILE=HCAPLUS ABB=ON  (MU OR MICRON?)(3A)INCLUSION?
L14            1 SEA FILE=HCAPLUS ABB=ON  L13 AND L9
L18            3 SEA FILE=HCAPLUS ABB=ON  L6 AND (AL OR ALUMINA OR ALUMINUM OR
                 ALUMIUM OR AL2O3 OR ALUMINUM(W)OXIDE) AND (CU OR COPPER) AND
                 (SI OR SILICON)
L19            3 SEA FILE=HCAPLUS ABB=ON  L18 AND L10
L32            0 SEA FILE=COMPENDEX ABB=ON  L19 OR L18 OR L12 OR L14

=> FILE JICST
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=> D QUE L33
L5         12565 SEA FILE=HCAPLUS ABB=ON  SPUTTER?(3A)TARGET?
L6            61 SEA FILE=HCAPLUS ABB=ON  L5 AND INCLUSION?
L7             3 SEA FILE=HCAPLUS ABB=ON  L6 AND (AL OR ALUMINA OR ALUMINUM OR
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L8          2393 SEA FILE=HCAPLUS ABB=ON  L5 AND ALLOY?
L9            17 SEA FILE=HCAPLUS ABB=ON  L6 AND L8
L10            3 SEA FILE=HCAPLUS ABB=ON  L7 AND L8
L11         6262 SEA FILE=HCAPLUS ABB=ON  (LOW OR SIZE OR MINUTE OR SMALL OR
                 800 OR 400)(3A)INCLUSION?
L12            4 SEA FILE=HCAPLUS ABB=ON  L9 AND L11
L13         1332 SEA FILE=HCAPLUS ABB=ON  (MU OR MICRON?)(3A)INCLUSION?
L14            1 SEA FILE=HCAPLUS ABB=ON  L13 AND L9
L18            3 SEA FILE=HCAPLUS ABB=ON  L6 AND (AL OR ALUMINA OR ALUMINUM OR
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L19            3 SEA FILE=HCAPLUS ABB=ON  L18 AND L10
L33            0 SEA FILE=JICST-EPLUS ABB=ON  L19 OR L18 OR L12 OR L14

=> FILE JAPIO
FILE 'JAPIO' ENTERED AT 14:42:45 ON 24 AUG 2004
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FILE LAST UPDATED: 2 AUG 2004      <20040802/UP>
FILE COVERS APR 1973 TO APRIL  30, 2004

<<< GRAPHIC IMAGES AVAILABLE >>>

=> D QUE L34
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L5          12565 SEA FILE=HCAPLUS ABB=ON  SPUTTER?(3A)TARGET?
L6             61 SEA FILE=HCAPLUS ABB=ON  L5 AND INCLUSION?
L7              3 SEA FILE=HCAPLUS ABB=ON  L6 AND (AL OR ALUMINA OR ALUMINUM OR
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L8           2393 SEA FILE=HCAPLUS ABB=ON  L5 AND ALLOY?
L9             17 SEA FILE=HCAPLUS ABB=ON  L6 AND L8
L10             3 SEA FILE=HCAPLUS ABB=ON  L7 AND L8
L11          6262 SEA FILE=HCAPLUS ABB=ON  (LOW OR SIZE OR MINUTE OR SMALL OR
                  800 OR 400)(3A)INCLUSION?
L12             4 SEA FILE=HCAPLUS ABB=ON  L9 AND L11
L13          1332 SEA FILE=HCAPLUS ABB=ON  (MU OR MICRON?)(3A)INCLUSION?
L14             1 SEA FILE=HCAPLUS ABB=ON  L13 AND L9
L18             3 SEA FILE=HCAPLUS ABB=ON  L6 AND (AL OR ALUMINA OR ALUMINUM OR
                  ALUMIUM OR AL2O3 OR ALUMINUM(W)OXIDE) AND (CU OR COPPER) AND
                  (SI OR SILICON)
L19             3 SEA FILE=HCAPLUS ABB=ON  L18 AND L10
L34             2 SEA FILE=JAPIO ABB=ON  L19 OR L18 OR L12 OR L14
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FILE COVERS 1964 TO DATE.

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=> D QUE L35
L5          12565 SEA FILE=HCAPLUS ABB=ON  SPUTTER?(3A)TARGET?
L6             61 SEA FILE=HCAPLUS ABB=ON  L5 AND INCLUSION?
L7              3 SEA FILE=HCAPLUS ABB=ON  L6 AND (AL OR ALUMINA OR ALUMINUM OR
                  ALUMIUM OR AL2O OR ALUMINUM(W)OXIDE) AND (CU OR COPPER) AND
                  (SI OR SILICON)
L8           2393 SEA FILE=HCAPLUS ABB=ON  L5 AND ALLOY?
L9             17 SEA FILE=HCAPLUS ABB=ON  L6 AND L8
L10             3 SEA FILE=HCAPLUS ABB=ON  L7 AND L8
L11          6262 SEA FILE=HCAPLUS ABB=ON  (LOW OR SIZE OR MINUTE OR SMALL OR
                  800 OR 400)(3A)INCLUSION?
L12             4 SEA FILE=HCAPLUS ABB=ON  L9 AND L11
L13          1332 SEA FILE=HCAPLUS ABB=ON  (MU OR MICRON?)(3A)INCLUSION?
L14             1 SEA FILE=HCAPLUS ABB=ON  L13 AND L9
L18             3 SEA FILE=HCAPLUS ABB=ON  L6 AND (AL OR ALUMINA OR ALUMINUM OR
                  ALUMIUM OR AL2O3 OR ALUMINUM(W)OXIDE) AND (CU OR COPPER) AND
                  (SI OR SILICON)
L19             3 SEA FILE=HCAPLUS ABB=ON  L18 AND L10
L35             0 SEA FILE=NTIS ABB=ON  L19 OR L18 OR L12 OR L14

=> SUP REM L20 L21 L30 L31 L34
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PROCESSING COMPLETED FOR L20
PROCESSING COMPLETED FOR L21
PROCESSING COMPLETED FOR L30
PROCESSING COMPLETED FOR L31
PROCESSING COMPLETED FOR L34
L37          16 DUP REM L20 L21 L30 L31 L34 (2 DUPLICATES REMOVED)

=> D L37 ALL 1-16

L37  ANSWER 1 OF 16  HCAPLUS  COPYRIGHT 2004 ACS on STN DUPLICATE 1
AN   2002:793862  HCAPLUS
DN   137:282823
ED   Entered STN:  18 Oct 2002
TI   Test method for determining the critical size of aluminum oxide
     inclusion to prevent arcing damage in Al or Al-alloy
     sputtering target
IN   Wickersham, Charles E., Jr.; Poole, John E.; Leybovich, Alexander; Zhu,
     Lin
PA   Tosoh SMD, Inc., USA
SO   PCT Int. Appl., 37 pp.
     CODEN: PIXXD2
DT   Patent
LA   English
IC   ICM  C23C
CC   56-6 (Nonferrous Metals and Alloys)
     Section cross-reference(s): 76
FAN.CNT 1
     PATENT NO.          KIND   DATE        APPLICATION NO.        DATE
     ---------------     ----   --------    --------------------   --------
PI   WO 2002081767        A2    20021017    WO 2002-US10516        20020404
     WO 2002081767        A3    20021205
         W:  JP, KR, US
         RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL,
             PT, SE, TR
     EP 1381703           A2    20040121    EP 2002-719429         20020404
         R:  AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT,
             IE, FI, CY, TR
     US 2004118675        A1    20040624    US 2003-473844         20030930
PRAI US 2001-281482P      P     20010404
     WO 2002-US10516      W     20020404
CLASS
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 PATENT NO.      CLASS  PATENT FAMILY CLASSIFICATION CODES
 -------------   -----  ---------------------------------------------
 WO 2002081767   ICM    C23C
```

AB The critical **size** for Al2O3 **inclusion** in the Al or Al-**alloy sputtering targets** is evaluated to prevent elec. arcing damage in sputtering. The test method includes sputtering in apparatus having Ar plasma with a known sheath thickness, and controlling the critical Al2O3 **inclusion size** to be below the plasma-sheath thickness. The exptl. plasma-sheath thickness is 300-600 μm, using the apparatus with Ar-sputtering power controlled at 8-60 W/cm2 and 0.5 Pa Ar pressure.

ST alumina crit **inclusion** aluminum **alloy** sputtering defect

IT **Sputtering targets**
(**inclusion** control in; **sputtering** test for determining critical **size** of alumina **inclusion** to prevent elec. arcing damage in Al or Al-**alloy sputtering target**)

IT Plasma
(sheath, sputtering thickness of; sputtering test for determining critical **size** of alumina **inclusion** to prevent elec. arcing damage in Al or Al-**alloy sputtering target**)

IT 1344-28-1, Alumina, properties
RL: PRP (Properties)
(**inclusion, sputtering target** with; **sputtering** test for determining critical **size** of alumina **inclusion** to prevent elec. arcing damage in Al or Al-**alloy sputtering target**)

IT 7429-90-5, Aluminum, processes
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PROC (Process)
(sputtering of; sputtering test for determining critical **size** of alumina **inclusion** to prevent elec. arcing damage in Al or Al-**alloy sputtering target**)

IT 7440-37-1, Argon, processes
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PROC (Process)
(sputtering with; sputtering test for determining critical **size** of alumina **inclusion** to prevent elec. arcing damage in Al or Al-**alloy sputtering target**)

L37 ANSWER 2 OF 16 HCAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 2
AN 2001:781190 HCAPLUS
DN 135:307185
ED Entered STN: 26 Oct 2001
TI Manufacture of **Al** or **Al-alloy** castings with **low inclusions** for **sputtering targets** resistant to surface defects
IN Wickersham, Charles E., Jr.; Poole, John E.; Leybovich, Alexander; Zhu, Lin
PA Tosoh SMD, Inc., USA
SO PCT Int. Appl., 24 pp.
CODEN: PIXXD2
DT Patent
LA English
IC ICM C22B009-02
ICS C23C014-34
CC 56-6 (Nonferrous Metals and Alloys)

applicants

Section cross-reference(s): 57

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2001079569	A1	20011025	WO 2001-US40473	20010409
	W: JP, KR, US				
	RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR				
	JP 2003531289	T2	20031021	JP 2001-576952	20010409
	US 2002184970	A1	20021212	US 2001-18406	20011213
PRAI	US 2000-197790P	P	20000414		
	US 2000-215037P	P	20000629		
	US 2000-249978P	P	20001120		
	WO 2001-US40473	W	20010409		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
WO 2001079569	ICM	C22B009-02
	ICS	C23C014-34

AB The **Al** or **Al-alloy** melt for cast **sputtering targets** having **low inclusions** is purified by: (a) **alloying** with 0.01-2.0% **Si**; (b) filtering the melt for **inclusion** removal, especially with sintered ceramic filters; and (c) casting the blanks for manufacture of **sputtering targets**. The addition of **Si** decreases the surface tension of molten **Al alloy**, and promotes **inclusion** removal on sintered ceramic filters. The process is suitable for the **Al alloy** typically containing 0.5 **Cu** and 0.5% **Si**, especially with the melt filtering to remove the **Al2O3 inclusions** of .gtoreq.**400** . **mu**.m size (as detectable by ultrasound testing). The cathodic **alloy** sputtering with low surface defects is suitable at the power d. of .apprx.25 W/cm2, especially for the sputtering of large flat panel displays.

ST cast **aluminum silicon copper alloy sputtering target; aluminum alloy** melt filtration cast **sputtering target**

IT **Sputtering targets**
(**Al** or **Al-alloy** castings from filtered melt with **low inclusions** for **sputtering targets**)

IT Cast **alloys**
RL: PEP (Physical, engineering or chemical process); PROC (Process)
(**aluminum**, for **sputtering targets; Al** or **Al-alloy** castings from filtered melt with **low inclusions** for **sputtering targets**)

IT Filters
(ceramic, sintered, for **Al-alloy** melt; **Al** or **Al-alloy** castings from filtered melt with **low inclusions** for **sputtering targets**)

IT Ceramics
(filters, sintered, for **Al-alloy** melt; **Al** or **Al-alloy** castings from filtered melt with **low inclusions** for **sputtering targets**)

IT Casting of metals
(melt filtration in; **Al** or **Al-alloy**

castings from filtered melt with **low inclusions** for **sputtering targets**)
IT Sound and Ultrasound
(test, **inclusion** detection by; **Al** or **Al-alloy** castings from filtered melt with **low inclusions** for **sputtering targets**)
IT 7440-21-3, **Silicon**, uses
RL: MOA (Modifier or additive use); USES (Uses)
(**Al-alloy** melt with; **Al** or **Al-alloy** castings from filtered melt with **low inclusions** for **sputtering targets**)
IT 7429-90-5, **Aluminum**, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(cast, for **sputtering targets; Al** or **Al-alloy** castings from filtered melt with **low inclusions** for **sputtering targets**)
IT 115336-59-9
RL: TEM (Technical or engineered material use); USES (Uses)
(for **sputtering targets; Al-alloy** castings from filtered melt with **low inclusions** for **sputtering targets**)
IT 1344-28-1, **Alumina**, processes
RL: REM (Removal or disposal); PROC (Process)
(**inclusions**, filtration of; **Al-alloy** castings from filtered melt with **low inclusions** for **sputtering targets**)
RE.CNT 2 THERE ARE 2 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE
(1) Pavate; US 6001227 A 1999 HCAPLUS
(2) Pavate; US 6139701 A 2000 HCAPLUS

L37 ANSWER 3 OF 16 HCAPLUS COPYRIGHT 2004 ACS on STN
AN 2001:904629 HCAPLUS
DN 136:30364
ED Entered STN: 14 Dec 2001
TI Magnetron sputtering for deposition of metal films using fine-grained target for decreased electric arcing and defects
IN Pitcher, Philip George; Yan, Zhihua; Kim, Jaeyeon; Rushing, Michael Alan
PA Honeywell International Inc., USA
SO PCT Int. Appl., 29 pp.
CODEN: PIXXD2
DT Patent
LA English
IC ICM C23C014-34
CC 76-2 (Electric Phenomena)
Section cross-reference(s): 56
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2001094659	A2	20011213	WO 2001-US17338	20010529
	WO 2001094659	A3	20020704		

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM
RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF,

BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG
PRAI US 2000-208506P P 20000602
CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
WO 2001094659	ICM	C23C014-34

AB The magnetron sputtering to form metal film on semiconductor wafers is improved by using fine-grained target with **low inclusions** to decrease the surface defects associated with elec. arcing. The metal or **alloy** target preferably has the grain size <20 μm, resulting in the sputtered film having <0.06 particles/cm2 of the wafer surface, with the particles having the size of ≤0.2 μm to avoid surface defects. The fine-grained target is typically installed with a backing plate, and the wafer substrate is spaced from the target for uniform deposition. The high-purity **Al**-0.5 **Cu** -0.2% **Si alloy** target was tested for .apprx.3500 s in sputtering at 15 W/cm2 and .apprx.2 mtorr Ar atmospheric, and showed no elec. arcing and low defects when the **alloy** grain size was 0.5 μm, vs. .apprx.115 accumulated arcing events with the target **alloy** grain size of 50 μm.

ST magnetron **sputtering target** coating semiconductor wafer; metal coating semiconductor wafer **sputtering target; aluminum alloy** sputtering semiconductor wafer coating

IT Magnetron sputtering
(coating; magnetron sputtering with clean metal or **alloy** films using fine-grained target)

IT **Sputtering targets**
(magnetron **sputtering** with clean metal or **alloy** films using fine-grained target)

IT Semiconductor materials
(wafers, metalizing of; sputtering with clean metal or **alloy** films using fine-grained target without arcing)

IT 7440-37-1, Argon, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(atmospheric, sputtering in low-pressure; magnetron sputtering with clean metal or **alloy** films using fine-grained target)

IT 7429-90-5, **Aluminum**, processes 7440-50-8, **Copper**, processes 167946-47-6
RL: EPR (Engineering process); PEP (Physical, engineering or chemical process); PROC (Process)
(sputtering with; magnetron sputtering with clean metal or **alloy** films using fine-grained target)

L37 ANSWER 4 OF 16 HCAPLUS COPYRIGHT 2004 ACS on STN
AN 2001:687508 HCAPLUS
DN 135:249234
ED Entered STN: 20 Sep 2001
TI Heat-treatable dichroic mirrors with a **silicon** nitride base film
IN Krisko, Annette J.; Maxwell, Scott A.
PA Cardinal Glass Industries, Inc., USA
SO U.S., 9 pp., Cont.-in-part of U.S. 6,262,850.
CODEN: USXXAM
DT Patent
LA English
IC ICM G02B027-14
ICS G02B001-10; G02B005-08
NCL 359634000
CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related

Properties)
Section cross-reference(s): 42, 69

FAN.CNT 3

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 6292302	B1	20010918	US 2000-522981	20000310
	TR 200101236	T2	20010921	TR 2001-200101236	19990311
	JP 2001253733	A2	20010918	JP 2000-142256	20000509
	WO 2001069291	A2	20010920	WO 2001-US7670	20010310

W: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, HR, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM

RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
	EP 1200855	A2	20020502	EP 2001-918517	20010310

R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
	AU 765667	B2	20030925	AU 2001-45585	20010310
PRAI	US 1998-185305	A2	19981103		
	US 2000-522981	A	20000310		
	WO 2001-US7670	W	20010310		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
US 6292302	ICM	G02B027-14
	ICS	G02B001-10; G02B005-08
	NCL	359634000

AB Heat-treatable dichroic mirrors are described which comprise (1) a transparent substrate with a glass transition temperature Tg of 650-800 °C; (2) a sputtered **silicon** nitride base film on the substrate; (3) a plurality of sputtered films on the substrate forming ≤2 pairs of contiguous films, the films of each pair having disparate refractive indexes differing by at least .apprx.0.2 and providing a reflective interface, the contiguous film pair including a first metal oxide film, and a second oxidizable metal or semimetal film positioned further from the substrate than the first film, and a protective overcoat of a thickness and composition sufficient to substantially prevent permeation of O2 through during heat treatment at Tg; in which the mirror, after the heat treatment, exhibits a transmittance of ≤24% in the 550-650 nm range, and a reflectance of ≤45%. Mirrors are discussed in which the first film comprises an oxide of titanium, zinc, niobium, tin, bismuth, or their **alloys**; the second film is **silicon**, niobium, **aluminum**, nickel, chromium, or their **alloys**; and the overcoat film is **silicon** nitride.
Methods for fabrication of the dichroic mirrors by magnetron sputtering are also discussed. The **inclusion** of an impurity during the deposition of the first film in order to retard haze formation upon heat treatment is described.

ST heat treatable dichroic mirror multilayer **silicon** nitride base fabrication

IT Magnetron sputtering
(heat-treatable dichroic mirrors prepared by magnetron sputtering of multilayer coating on transparent substrate)

IT Glass substrates
(heat-treatable dichroic mirrors with improved durability and optical performance containing)

IT Oxides (inorganic), properties
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process); USES (Uses)
(metal; heat-treatable dichroic mirrors with improved durability and optical performance containing)
IT Mirrors
(multilayer; heat-treatable dichroic mirrors having a **silicon** nitride base film and improved durability and optical performance)
IT Coating materials
(reflective; heat-treatable dichroic mirrors prepared by magnetron sputtering of multilayer coating on transparent substrate)
IT Vinegar
(testing durability of heat-treatable dichroic mirrors using solution containing)
IT 7727-37-9, Nitrogen, uses 7782-44-7, Oxygen, uses
RL: NUU (Other use, unclassified); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(heat-treatable dichroic mirrors prepared by magnetron sputtering of multilayer coating on transparent substrate in atmospheric containing)
IT 13463-67-7D, Titanium oxide, oxygen-deficient, uses
RL: NUU (Other use, unclassified); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(heat-treatable dichroic mirrors prepared by magnetron sputtering of multilayer coating on transparent substrate including **sputtering** from **target** comprising)
IT 7429-90-5, **Aluminum**, properties
RL: DEV (Device component use); MOA (Modifier or additive use); PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process); USES (Uses)
(heat-treatable dichroic mirrors with improved durability and optical performance containing)
IT 1304-76-3, Bismuth oxide, properties 1314-13-2, Zinc oxide ZnO, properties 1332-29-2, Tin oxide 7440-02-0, Nickel, properties 7440-03-1, Niobium, properties 7440-21-3, **Silicon**, properties 7440-47-3, Chromium, properties 12033-89-5, **silicon** nitride Si3N4, properties 12627-00-8, Niobium oxide 13463-67-7, Titanium oxide, properties
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process); USES (Uses)
(heat-treatable dichroic mirrors with improved durability and optical performance containing)
IT 17778-88-0, Nitrogen, atomic, properties
RL: DEV (Device component use); OCU (Occurrence, unclassified); PEP (Physical, engineering or chemical process); PRP (Properties); OCCU (Occurrence); PROC (Process); USES (Uses)
(impurity; heat-treatable dichroic mirrors with improved durability and optical performance containing)
IT 64-19-7, Acetic acid, uses 7447-39-4, **copper** chloride CuCl2, uses 7647-01-0, Muriatic acid, uses 7647-14-5, Sodium chloride, uses
RL: NUU (Other use, unclassified); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(testing durability of heat-treatable dichroic mirrors using solution containing)
RE.CNT 30 THERE ARE 30 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE
(1) Adair; US 5728456 1998
(2) Anon; EP 0482933 1991 HCAPLUS
(3) Anon; WO 9725451 1997 HCAPLUS
(4) Bauer; US 5808778 1998

(5) Blickensderfer; US 4098956 1978
(6) Caskey; US 5535056 1996
(7) Caskey; US 5751489 1998
(8) Chapin; US 4166018 1979 HCAPLUS
(9) Depauw; US 6064525 2000
(10) Gillery; US 4861669 1989 HCAPLUS
(11) Gillery; US 4938857 1990 HCAPLUS
(12) Gillery; US 5705278 1998 HCAPLUS
(13) Hartig; US 5584902 1996 HCAPLUS
(14) Hartig; US 5800933 1998 HCAPLUS
(15) Iida; US 5085926 1992 HCAPLUS
(16) Ingrey; US 3962062 1976 HCAPLUS
(17) Kobayashi; US 5342675 1994 HCAPLUS
(18) Krisko; US 6142642 2000
(19) Lingle; US 5242560 1993 HCAPLUS
(20) Muth; US 5788357 1998
(21) Ohsuki; US 5543229 1996 HCAPLUS
(22) Roberts; US 5014167 1991
(23) Roberts; US 5207492 1993
(24) Roberts; US 5355284 1994
(25) Roberts; US 5361190 1994
(26) Roberts; US 5481409 1996
(27) Szczyrbowski; US 5170291 1992 HCAPLUS
(28) Szczyrbowski; US 5279722 1994 HCAPLUS
(29) Tracy; US 4780372 1988 HCAPLUS
(30) Tracy; US 4963012 1990

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L37  ANSWER 5 OF 16  WPIX COPYRIGHT 2004 THOMSON DERWENT on STN
AN   2002-130539 [17]   WPIX
DNN  N2002-098478       DNC C2002-040073
TI   Homogeneous sputtering target testing involves sonic
     irradiation to produce echoes, which are sorted according to indicate
     presence or not of inhomogeneity, then clustering echoes to generate
     information about inhomogeneity.
DC   J04 S03
IN   FLEMING, R H; GORE, R B
PA   (HONE) HONEYWELL INT INC
CYC  96
PI   WO 2001092868   A2 20011206 (200217)* EN   41    G01N029-04
        RW: AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW MZ
            NL OA PT SD SE SL SZ TR TZ UG ZW
         W: AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CO CR CU CZ DE DK
            DM DZ EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ
            LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ PL PT RO RU SD
            SE SG SI SK SL TJ TM TR TT TZ UA UG UZ VN YU ZA ZW
     AU 2001075007   A  20011211 (200225)              G01N029-04
     US 6439054      B1 20020827 (200259)              G01N029-04
     TW 511205       A  20021121 (200353)              H01L021-66
ADT  WO 2001092868 A2 WO 2001-US17342 20010529; AU 2001075007 A AU 2001-75007
     20010529; US 6439054 B1 US 2000-585242 20000531; TW 511205 A TW
     2001-113214 20010830
FDT  AU 2001075007 A Based on WO 2001092868
PRAI US 2000-585242        20000531
IC   ICM  G01N029-04; H01L021-66
     ICS  C23C014-34; G01N029-20
AB   WO 200192868 A UPAB: 20020313
     NOVELTY - Testing homogeneous materials for inhomogeneities involves
     sonically irradiating positions across a material, detecting echoes and
     associating with the position that triggered the echo, processing
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information relating to echo to sort them into groups indicative and not indicative of inhomogeneities. Echoes in the first groups are clustered at adjacent positions of the material, and analyzed to generate information about an inhomogeneity in the material.

DETAILED DESCRIPTION - Testing homogeneous materials for inhomogeneities (40,42) involves sonically irradiating (22) positions across at least part of a material (10), detecting echoes (24) induced by inhomogeneities and associating with the position that triggered the echo, processing (34) information relating to at least one physical attribute of the echo to sort them into groups indicative and not indicative of inhomogeneities. Echoes in the first groups are clustered at adjacent positions of the material, and analyzed to generate information about an inhomogeneity in the material.

USE - For non-destructive evaluation of **sputtering target** materials.

ADVANTAGE - Use of ultrasonics ensures non-destructive testing. This is important as integrated circuit devices become increasingly smaller, with decreased tolerance for uniformity and undesired particles. Previous ultrasonic methods cannot differentiate between different types of defect, and thus do not consider differences in ultrasonic response to the various types of defect. Other problems relate to incomplete accounting of depth effect, and further by considering one point per effect, rather than in this technique, a number of points per defect. Non-uniform erosion of the target is considered as a function of the erosion profile.

DESCRIPTION OF DRAWING(S) - The diagram shows an ultrasonic **sputtering target** testing system.

target 10
transducer 20
ultrasonic pulse 22
echo 24
processor 34
inhomogeneities 40,42
Dwg.2/12

FS CPI EPI
FA AB; GI
MC CPI: J04-C
EPI: S03-E08A; S03-E08X

L37 ANSWER 6 OF 16 WPIX COPYRIGHT 2004 THOMSON DERWENT on STN
AN 1999-347735 [29] WPIX
CR 2000-648715 [63]; 2001-292932 [31]
DNN N1999-259970 DNC C1999-102415
TI **Sputtering target** for direct current magnetron sputtering of thin films.
DC L03 U11
IN HANSEN, K J; MORI, G; NARASIMHAN, M; NULMAN, J; PAVATE, V; RAMASWAMI, S
PA (MATE-N) APPLIED MATERIALS INC
CYC 22

PI	WO 9927150	A1	19990603	(199929)*	EN	56	C23C014-34
	RW: AT BE CH CY DE DK ES FI FR GB GR IE IT LU MC NL PT SE						
	W: JP KR						
	US 6001227	A	19991214	(200005)			
	EP 1036211	A1	20000920	(200047)	EN		C23C014-34
	R: BE DE FR GB NL						
	US 6126791	A	20001003	(200050)			C23C014-34
	US 6171455	B1	20010109	(200104)			C23C014-34
	US 6228186	B1	20010508	(200128)			C22F001-00
	KR 2001032530	A	20010425	(200164)			C23C014-34
	JP 2001524600	W	20011204	(200203)		37	C23C014-34

TW 467958 A 20011211 (200254) C23C014-26
ADT WO 9927150 A1 WO 1998-US22771 19981026; US 6001227 A US 1997-979192 19971126; EP 1036211 A1 EP 1998-957387 19981026, WO 1998-US22771 19981026; US 6126791 A Cont of US 1997-979192 19971126, US 1999-419827 19991014; US 6171455 B1 Cont of US 1997-979192 19971126, US 1999-419712 19991014; US 6228186 B1 Cont of US 1997-979192 19971126, US 1999-418672 19991014; KR 2001032530 A KR 2000-705773 20000526; JP 2001524600 W WO 1998-US22771 19981026, JP 2000-522288 19981026; TW 467958 A TW 1998-116466 19981002
FDT EP 1036211 A1 Based on WO 9927150; US 6126791 A Cont of US 6001227; US 6171455 B1 Cont of US 6001227; US 6228186 B1 Cont of US 6001227; JP 2001524600 W Based on WO 9927150
PRAI US 1997-979192 19971126; US 1999-419827 19991014;
US 1999-419712 19991014; US 1999-418672 19991014
IC ICM C22F001-00; C23C014-26; C23C014-34
ICS C22F001-04; H01L021-285
AB WO 9927150 A UPAB: 20020823
NOVELTY - The targets are made by a metallurgical process which reduces the number and size of conductivity anomalies such as oxide **inclusions**. By close specification of the purity, number and **size** of **inclusions**, and **size** homogeneity of metal grains in the target, defect free metal films are formed with reduced blob and splat formation.

DETAILED DESCRIPTION - Target for a DC magnetron sputtering system with a deposition producing portion comprising an electrically conductive to be deposited metal with; (a) Homogenous content of at most 10,000 / g conductivity anomalies, with each anomaly at most 1 mu m wide and defining an insulative or high resistivity region. High resistivity at least 100 times greater than the resistivity of anomaly free metal. The number of anomalies is preferably at most 5,000 / g at at most 0.1 mu m wide. The target is produced from a metal with at most 10 ppm oxygen by casting by continuous flow casting, and working to produce a homogenous distribution of metal grains each at most 100 mu m diameter. Also included is a method of deposition using a target with at least two properties from; (a) (1) at most 10,000 dielectric **inclusions** / g with width at most 0.3 mu m, (2) hydrogen at most 0.5 ppm. (3) Carbon at most 10 ppm. (4) Oxygen at most 10 ppm. (5) Nitrogen at most 10 ppm. (6) Homogenous distribution of metal grains at most 100 mu m diameter. (7) Homogenous distribution of second phase precipitates 1 - 10 mu m diameter. (8) at least 50 % having (200) texturing. (9) Microhardness at least 50 Rockwell. (10) Initial surface roughness of the deposition producing portion at most 20 mu in. (b) Ramping up plasma power at an average rate of at most 2 kW / sec.

USE - Physical vapor deposition of aluminum or aluminum **alloy** thin films semiconductor devices and integrated circuits.

ADVANTAGE - Thin films with low defect densities are reduced, with reduced blob and splat formation

DESCRIPTION OF DRAWING(S) - The drawing shows the process flow for the fabrication of a **sputter target**.
Dwg.3/5
FS CPI EPI
FA AB; GI
MC CPI: L04-C10C; L04-D02
EPI: U11-C05C2; U11-C09A

L37 ANSWER 7 OF 16 INSPEC (C) 2004 FIZ KARLSRUHE on STN
AN 1998:5997287 INSPEC DN A9818-6855-134; B9809-2550F-039
TI Defect control in high purity metals for <0.25 mu m interconnect applications.
AU Gilman, P.S. (Adv. Mater. Div., Mater. Res. Corp., Orangeburg, NY, USA)
SO Physica Status Solidi A (16 June 1998) vol.167, no.2, p.503-11. 7 refs.

Published by: Akademie Verlag
Price: CCCC 0031-8965/98/$17.50+0.50
CODEN: PSSABA ISSN: 0031-8965
SICI: 0031-8965(19980616)167:2L.503:DCHP;1-H
Conference: Fourth International Conference on Ultra-High-Purity
Metallic-Base Materials (UHPM-97). Philadelphia, PA, USA, 11-13 Sept 1997
DT Conference Article; Journal
TC Experimental
CY Germany, Federal Republic of
LA English
AB Metal purity for interconnect applications deposited by physical vapor deposition has steadily improved of the point where 5N5 purity for aluminum **alloys** is routinely exceeded, while for titanium metal purity is at 5N and progressing to 6N. However, recent industrial experience indicates that metal purity is only one requirement necessary for defect control for <0.25 mu m metal width applications, especially regarding particles or contamination that originate from **sputtering targets**. For example, aluminum **alloys** of identical purity can have vastly different droplet performance; where the droplets are localized, target-surface melting may originate from micro-arcing caused by aluminum oxide or carbon **inclusions**. These>5 **mu** m diameter droplets lead to shorts that drastically reduce device yield. Also, nodule formation on the surfaces of titanium metal targets appears to be independent of metal purity. Fragmentation of the deposited nodules is one source of titanium particles. Aluminum-droplet formation and titanium-nodule formation will be discussed, as well as recent efforts to reduce the defect contributions of these metals.
CC A6855 Thin film growth, structure, and epitaxy; A6170Q Inclusions and voids; A8160B Surface treatment and degradation of metals and alloys; B2550F Metallisation and interconnection technology
CT **ALUMINIUM ALLOYS**; CRYSTAL DEFECTS; IMPURITIES; **INCLUSIONS**; SEMICONDUCTOR DEVICE METALLISATION; **SPUTTERED** COATINGS; TITANIUM; TRANSMISSION ELECTRON MICROSCOPY
ST high purity metals; metal purity; interconnect applications; physical vapor deposition; defect control; contamination; droplets; target-surface melting; **inclusions**; nodule formation; nodule fragmentation; 0.25 mum; AlCu; Ti
CHI AlCu int, Al int, Cu int, AlCu bin, Al bin, Cu bin; Ti int, Ti el
PHP size 2.5E-07 m
ET N; Al*Cu; Al sy 2; sy 2; Cu sy 2; AlCu; Al cp; cp; Cu cp; Ti; Al; Cu

L37 ANSWER 8 OF 16 HCAPLUS COPYRIGHT 2004 ACS on STN
AN 1997:684335 HCAPLUS
DN 127:321819
ED Entered STN: 29 Oct 1997
TI Sintering of tungsten-titanium **sputtering targets** having single-phase structure for coating uniformity
IN Lo, Chi-fung
PA Sony Corp., Japan; Materials Research Corp.
SO PCT Int. Appl., 19 pp.
CODEN: PIXXD2
DT Patent
LA English
IC ICM B22F003-00
ICS C22C027-04; C25B009-00
CC 56-4 (Nonferrous Metals and Alloys)
Section cross-reference(s): 76
FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI WO 9737801	A1	19971016	WO 1997-IB519	19970321

W: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM

RW: GH, KE, LS, MW, SD, SZ, UG, AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
AU 9724002	A1	19971029	AU 1997-24002	19970321
TW 402642	B	20000821	TW 1997-86104459	19970408
PRAI US 1996-630155	A	19960410		
WO 1997-IB519	W	19970321		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
WO 9737801	ICM	B22F003-00
	ICS	C22C027-04; C25B009-00

AB The starting mixture of W and 1-30% Ti powders is pressed at 0.5-40 kpsi and heated to 1300-1650° (especially by hot isostatic pressing) for sintering to manufacture the **sputtering target** having 1-phase W-Ti **alloy** structure. The sintered high-d. target is suitable for uniform sputtering with **low** emission of **inclusion** -phase particles, especially in the coating of semiconductor devices. The W-10% Ti **alloy** target sintered to 98.7% of theor. d. was sputtered to deposit the film 1350 Å thick on Si semiconductor wafers, resulting in the clean film with **inclusion** particles at only 7/m2, vs. 118/m2 with the similar com. target having multiphase structure.

ST sintered tungsten titanium **target sputtering**; semiconductor sputtering tungsten titanium film

IT Sputtering
(titanium-tungsten **alloy**; sintered tungsten-titanium **alloy** for **sputtering targets** having single-phase structure for coating uniformity)

IT 7440-21-3, Silicon, processes
RL: PEP (Physical, engineering or chemical process); PROC (Process)
(semiconductor, sputter coating of; sintered tungsten-titanium **alloy** for **sputtering targets** having single-phase structure for coating on semiconductors)

IT 58397-70-9 150259-55-5
RL: PEP (Physical, engineering or chemical process); PROC (Process)
(sputtering of; sintered tungsten-titanium **alloy** for **sputtering targets** having single-phase structure for coating uniformity)

L37 ANSWER 9 OF 16 JAPIO (C) 2004 JPO on STN
AN 1997-025564 JAPIO
TI ALUMINUM OR ALUMINUM **ALLOY SPUTTERING TARGET**
IN FUKUYO HIDEAKI; NAGASAWA TAKASHI; OKABE GAKUO
PA JAPAN ENERGY CORP
PI JP 09025564 A 19970128 Heisei
AI JP 1995-192619 (JP07192619 Heisei) 19950706
PRAI JP 1995-192619 19950706
SO PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 1997
IC ICM C23C014-34
ICS C22B021-06; C22F001-04

AB PROBLEM TO BE SOLVED: To obtain a high purity aluminum or aluminum **alloy sputtering target** small in the generation of particles.
SOLUTION: In a high purity aluminum (**alloy**) **sputtering target**, particles at the time of sputtering are generated by the burst of **inclusions**, particularly, oxides in the target, furthermore, the resticking of the grains to the vicinity of pores opened by the burst occurs, and this restuck materials peel to cause particles. Then, the abundance of **inclusions** with >=10&**mu**;m average diameter appearing on the **sputtering** face of the **target** is regulated to <40 pieces/cm<SP>2</SP>, and furthermore, the content of oxygen in the target is regulated to <150ppm.

L37 ANSWER 10 OF 16 INSPEC (C) 2004 FIZ KARLSRUHE on STN
AN 1996:5468339 INSPEC DN A9704-6855-015
TI Structure and chemical composition of lamellae in **sputtered** AlSn20 films.
AU Schattschneider, P.; Bangert, H.; Pongratz, P.; Bergauer, A. (Inst. fur Angewandte und Tech. Phys., Tech. Univ. Wien, Austria); Barna, P.B.; Hofer, F.
SO Materials Science Forum (1996) vol.217-222, pt.3, p.1667-72. 7 refs.
Published by: Trans Tech Publications
CODEN: MSFOEP ISSN: 0255-5476
SICI: 0255-5476(1996)217/222:3L.1667:SCCL;1-P
Conference: Aluminium Alloys. Their Physical and Mechanical Properties. 5th International Conference ICAA5. Grenoble, France, 15 July 1996
DT Conference Article; Journal
TC Experimental
CY Switzerland
LA English
AB In AlSn **sputter** films, a lamellar structure has been found. The lamellae might be associated with the excellent mechanical properties of the alloy. Transmission electron microscopy (TEM) revealed elongated inclusions arranged along projections of (111)- and (100)-planes, with a width of approximately 3 nm. EDX and PEELS analysis at high resolution showed that the tin and the oxygen content is increased at these inclusions where also Ti and N was found. Moreover, there is some evidence for Sn segregation at twin boundaries without increase of oxygen.
CC A6855 Thin film growth, structure, and epitaxy; A8115C Deposition by sputtering; A6170Q Inclusions and voids; A6170N Grain and twin boundaries; A6480G Microstructure; A6475 Solubility, segregation, and mixing; A8140P Friction, lubrication, and wear; A8280D Electromagnetic radiation spectrometry (chemical analysis); A8140C Solid solution hardening, precipitation hardening, dispersion hardening; A8130M Precipitation
CT **ALUMINIUM ALLOYS**; ELECTRON ENERGY LOSS SPECTRA; GRAIN BOUNDARY SEGREGATION; **INCLUSIONS**; ISLAND STRUCTURE; OXIDATION; PRECIPITATION; SOLID SOLUBILITY; **SPUTTERED** COATINGS; TIN ALLOYS; TRANSMISSION ELECTRON MICROSCOPY; TWIN BOUNDARIES; WEAR RESISTANT COATINGS; X-RAY CHEMICAL ANALYSIS
ST **sputtered films**; chemical composition; lamellar structure; mechanical properties; TEM; elongated inclusions; EDX; PEELS analysis; oxygen content; twin boundary segregation; 3 nm; AlSn
CHI AlSn bin, Al bin, Sn bin; AlSn sur, Al sur, Sn sur, AlSn bin, Al bin, Sn bin
PHP size 3.0E-09 m
ET Al*Sn; Al sy 2; sy 2; Sn sy 2; AlSn; Al cp; cp; Sn cp; In; Ti; N; Sn; Al

L37 ANSWER 11 OF 16 JAPIO (C) 2004 JPO on STN

AN 1994-017246 JAPIO
TI CHROMIUM **SPUTTERING TARGET**
IN TANAKA HIROSHI; HIDAKA HIROAKI; HANAWA KOICHI; SEKINE SHINJI
PA TOSOH CORP
PI JP 06017246 A 19940125 Heisei
AI JP 1992-199003 (JP04199003 Heisei) 19920703
PRAI JP 1992-199003 19920703
SO PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 1994
IC ICM C23C014-34
ICS C23C014-14
AB PURPOSE: To suppress the particles generated from a target so as to prevent the intrusion of the particles into a film and to improve the yield of the thin-film product by limiting the amount of the **inclusions** which exist in the target and are exposed on the surface.
CONSTITUTION: This chromium **sputtering target** is restricted in the amount of the **inclusions** (for example, the oxide, nitride, etc., of **aluminum, silicon, copper,** etc.) in a **target** material to be **sputtered.** The diameter of the one part of the **inclusions** exposed on the target surface is confined to >=1μm and the total of the areas thereof to <=0.1% (of the front surface of the target). The particles generated from the **target** during **sputtering** is thus suppressed and the yield of the thin-film product is improved.

L37 ANSWER 12 OF 16 WPIX COPYRIGHT 2004 THOMSON DERWENT on STN
AN 1993-300009 [38] WPIX
DNN N1993-231039 DNC C1993-133682
TI Titanium -**sputtering target** for semiconductor device mfr. - contains **inclusions** of oxide, nitride, and carbide at grain boundaries of titanium.
DC L03 M13 U11
PA (TOYJ) TOSOH CORP
CYC 1
PI JP 05214519 A 19930824 (199338)* 3 C23C014-34
ADT JP 05214519 A JP 1992-38416 19920130
PRAI JP 1992-38416 19920130
IC ICM C23C014-34
AB JP 05214519 A UPAB: 19931123
Target contains at least one **micron size inclusions** of oxide, nitride, and carbide of up to 100 **inclusions** per cm2 of flat surface of the target which are present at the grain boundaries of the Ti that constitutes the target.
USE - For forming Ti-film having less particles at the surface, used in making semiconductor devices.
Dwg.0/0
FS CPI EPI
FA AB
MC CPI: L04-C10F; L04-D02; M13-G02
EPI: U11-C05C2; U11-C09A

L37 ANSWER 13 OF 16 INSPEC (C) 2004 IEE on STN
AN 1994:4648851 INSPEC DN A9410-8160B-045
TI The regularities of selective oxidation of copper-aluminium solid solutions.
AU Akimov, A.G.; Melnikova, N.A. (Inst. of Phys. Chem., Acad. of Sci., Moscow, Russia)
SO Evolution of Surface and Thin Film Microstructure Symposium

Editor(s): Atwater, H.A.; Chason, E.; Grabow, M.H.; Lagally, M.G.
Pittsburgh, PA, USA: Mater. Res. Soc, 1993. p.565-70 of xix+752 pp. 11 refs.
Conference: Boston, MA, USA, 30 Nov-4 Dec 1992

DT Conference Article
TC Experimental
CY United States
LA English
AB The regularities of selective oxidation of copper solid solutions with 2-12 atomic% aluminium have been studied by TEM, XPS and AES in combination with argon ion **sputtering**. It has been obtained that the increase of the aluminium concentrations in the solid solutions leads to the change of the oxidation mechanism. The internal oxidation of aluminium in Cu+(2-4at.%)Al results in the formation of the microinclusions of Al2O3 in the alloy. It has been demonstrated that the selective oxidation of aluminium in Cu+(12 atomic%)Al results in the formation of uniform thin (<10 nm) aluminium oxide at the alloy surface. The kinetics of this alloy oxidation obeys the parabolic law.
CC A8160B Metals and alloys; A8265J Heterogeneous catalysis at surfaces and other surface reactions; A7920F Electron impact: Auger emission; A7960G Composite surfaces; A7920N Atom, molecule, and ion impact
CT **ALUMINIUM ALLOYS**; AUGER EFFECT; COPPER ALLOYS; **INCLUSIONS**; OXIDATION; REACTION KINETICS; **SPUTTERING**; SURFACE CHEMISTRY; TRANSMISSION ELECTRON MICROSCOPE EXAMINATION OF MATERIALS; X-RAY PHOTOELECTRON SPECTRA
ST selective oxidation; solid solutions; TEM; XPS; AES; **ion sputtering**; oxidation mechanism; internal oxidation; microinclusions; aluminium oxide; kinetics; alloy oxidation; parabolic law; Cu-Al; Al2O3
CHI CuAl sur, Al sur, Cu sur, CuAl ss, Al ss, Cu ss; Al2O3 sur, Al2 sur, Al sur, O3 sur, O sur, Al2O3 bin, Al2 bin, Al bin, O3 bin, O bin
ET Cu; Al; Al*O; Al2O3; Al cp; cp; O cp; Al*Cu; Al sy 2; sy 2; Cu sy 2; Cu-Al; CuAl; Cu cp; Al2O; O

L37 ANSWER 14 OF 16 METADEX COPYRIGHT 2004 CSA on STN
AN 1993(3):43-87 METADEX
TI Recent Development of High Purity Advanced Metals and **Alloys** Using Calcia Refining Process.
AU Degawa, T. (Mitsui Engineering and Shipbuilding)
SO Metallurgical Industry Press. 39 Songzhuyuan Beixiang, Beiheyan Dajie, 100009, Beijing, China. 1991. 54-64, Graphs, 16 ref. Accession Number: 93(3):72-125
Conference: Proceedings of the Tenth International Conference on Vacuum Metallurgy. Vol. I. Special Melting, Beijing, China, 11-15 June 1990
DT Conference Article
CY China
LA English
AB The calcia (CaO) crucible provides excellent refining properties during the melting of metals and **alloys**. Calcia has excellent thermodynamic stability making it possible to melt high-melting-point reactive metals and **alloys** which are presently considered difficult to melt in a crucible. By employing calcia crucibles with Vacuum Induction Melting (VIM), it is now easily possible to produce extremely low gas, homogeneous, clean and high purity advanced metals. This is a direct result of the calcia refining process which occurs in the crucible during melting. This paper first summarizes the mechanism of the refining effect for molten metal using calcia. The reactions of deoxidation, desulphurization, denitrization, and the removal of **inclusions** are included. These reactions are shown to take place mainly on the crucible wall. Some successful applications of the calcia refining process

for the electronics field are shown. These applications include **sputtering targets** for high density magnetic recording media, and head materials such as Co-Cr, Co-Ni, Tb-Fe-Co, Mn-Sb, Fe-**Al-Si**, Ni-Fe, Co-Nb-Zr, etc. In addition, the refining of superconductor mother **alloys** for in situ **Cu**-Nb wire and also high temperature **Cu**-Ba-Y and **Cu**-Ca-Sr oxides is described. **Alloys** made through calcia refining show excellent characteristics for their respective functions as a result of the high-purity, low gas content, and high homogeneity obtained. Third, the trial application for advanced structural **alloys** which include castings for aerospace and marine equipment is reviewed. Superalloys for high temperature turbine components require long fatigue and creep life. These properties can be enhanced by the high-cleanliness and low gas content obtained by calcia refining. For marine and corrosive environments, Ti, Cr, and their **alloys** can be melted in calcia using conventional VIM, providing an opportunity for significant cost reduction. Finally, the prospects for future applications of calcia to advanced **alloy** processing are discussed. Recent results indicate the possibility for the elting and casting of the developing Intermetallic compounds such as TiAl, NiTi, and Ni3Al.

CC 43 Refining and Purification

CT Conference Paper; Nickel base **alloys**: Refining; Superalloys: Refining; Titanium base **alloys**: Refining; Chromium base **alloys**: Refining; Superconductors: Refining; Vacuum induction melting; Lime; Vacuum refining

ALI Mar-M247 CCA: NI, SP

ET Ca*O; CaO; Ca cp; cp; O cp; Co*Cr; Co sy 2; sy 2; Cr sy 2; Co-Cr; Co*Ni; Ni sy 2; Co-Ni; Co*Fe*Tb; Co sy 3; sy 3; Fe sy 3; Tb sy 3; Tb-Fe-Co; Mn*Sb; Mn sy 2; Sb sy 2; Mn-Sb; Al*Fe*Si; Al sy 3; Si sy 3; Fe-Al-Si; Fe*Ni; Fe sy 2; Ni-Fe; Co*Nb*Zr; Nb sy 3; Zr sy 3; Co-Nb-Zr; Cu*Nb; Cu sy 2; Nb sy 2; Cu-Nb; Ba*Cu*Y; Ba sy 3; Cu sy 3; Y sy 3; Cu-Ba-Y; Ca*Cu*Sr; Ca sy 3; Sr sy 3; Cu-Ca-Sr; Ti; Cr; Al*Ti; Al sy 2; Ti sy 2; TiAl; Ti cp; Al cp; Ni*Ti; NiTi; Ni cp; Al*Ni; Ni3Al

L37 ANSWER 15 OF 16 METADEX COPYRIGHT 2004 CSA on STN

AN 1991(9):51-1449 METADEX

TI The Electron Beam Evaporation and Deposition Process.

AU Bianchi, L.

CS Inmet

SO JOM (May 1991) 43, (5), 45-47
ISSN: 0148-6608

DT Journal

LA English

AB The electron beam evaporation and deposition (EBED) process produces virtually defect-free ingots, disks and cylindrical shapes using materials such as Ti-6Al-4V, Ti-5Al-4V, Inconel 600, 20Cr, Rene 95, and CoCrAlY. When produced by EBED, high-temperature **alloys** have virtually no **inclusions** and Ti **alloys** have essentially no **low** -density **inclusions** (Type I defects). Most **alloys** produced by the process have grain sizes of < 10 mu m and are superplastic. Envisioned applications of EBED include the production of complex cylindrical shapes, high-purity **sputtering targets**, higher-fabricability **alloys**, and hot-section disks and compressor for aircraft engines. Graphs, Photomicrographs. 12 reference-AA

CC 51 FOUNDRY

CT Titanium base **alloys**: Melting; Copper base **alloys**: Melting; Cobalt base **alloys**: Melting; Nickel base **alloys** : Melting; Superalloys: Melting; Chromium steels: Melting; Electron beam

melting: Development; Vapor deposition: Development; Vaporizing; Evaporation; New technology; Compressor blades; Disks; Purity
ALI Ti-6Al-4V, Ti-5Al-4V CCA: TI; Inconel 600, Rene 95 CCA: NI, SP; 20Cr CCA: SAC; CoCrAlY CCA: CO
; ALLOY3 Ti 6 Al 4 V ALLOY3 Ti 5 Al 4 V CCA: TI; CCA: NI, SP; CCA: SAC; ALLOY4 Co Cr Al Y CCA: CO
ET Al*Ti*V; Al sy 3; sy 3; Ti sy 3; V sy 3; Ti-6Al-4V; Ti-5Al-4V; Cr; Al*Co*Cr*Y; Al sy 4; sy 4; Co sy 4; Cr sy 4; Y sy 4; CoCrAlY; Co cp; cp; Cr cp; Al cp; Y cp; Ti; I; I*T; TI; T cp; I cp; C*O; CO; C cp; O cp

L37 ANSWER 16 OF 16 METADEX COPYRIGHT 2004 CSA on STN
AN 1991(7):63-147 METADEX
TI Effect of Impurities in Al-Si **Sputtering Targets** on Their **Sputtering** Behaviour.
AU Cichy, H.; Roeser, K.E.
CS Siemens
SO DGM Informationsgesellschaft. Adenauer Allee 21, D6370 Oberursel, Germany. 1990. 1161-1165. Accession Number: 91(7):72-351
Conference: Advanced Materials and Processes-Proceedings of the First European Conference. EUROMAT '89. Vol. 2, Aachen, Germany, 22-24 Nov. 1989
DT Conference
LA English
AB The examination of the microstructure of more than ten targets shows great differences in Al grain size and distribution and size of the Si precipitations. The best sputtering perfomance can be achieved with a uniform microstructure keeping the Si in solid solution or tolerating only small precipitations respectively. However, besides the Si nodules, impurities (e.g. potassium, Na) transferred from the target to the wafer can result in a malfunction of the circuit. So, for instance, Cl ions can be the reason for local attack by corrosion. With the introduced tensile test the qualitative detection of **inclusions** is quite easy.
Using current methods of microanalyses, e.g. AAS, ICP, GD, identification of these **small** amounts of **inclusions** in the bulk material is not possible. The reason is their appearance in clusters, which are irregularly distributed over the volume of the target.
Photomicrographs. 5 reference-AA
CC 63 ELECTRONIC DEVICES
CT Aluminum base **alloys**: Thin films; Silicon: **Alloying** elements; Sputtered films: Microstructure; Precipitates; Microstructure: Impurity effects; Impurities; Metallizing
ET Al*Si; Al sy 2; sy 2; Si sy 2; Al-Si; Al; Si; Na; Cl

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